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(54) Apparatus for the discontinuous wrapping of sweets

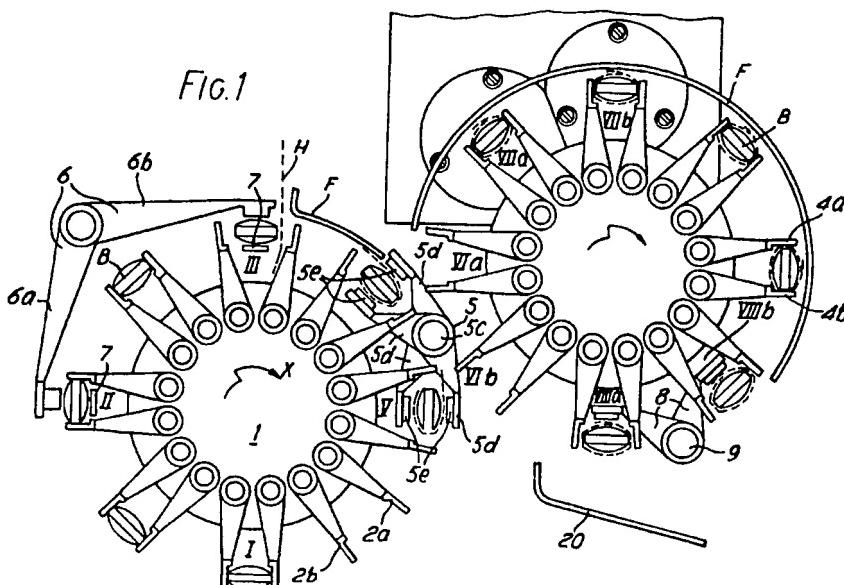
(57) The invention relates to an apparatus for the discontinuous wrapping of sweets, employing a gripper wheel 1 which has a plurality of radial holding elements 2a, 2b and, disposed alongside it, a wrapping wheel 3 which has a corresponding number of holding elements 4a, 4b, and rotates in the same direction of rotation as the gripper wheel, a wrapper H being fed radially from outside into position between the opened holding elements of the gripper wheel.

The object of the invention is to increase the output of discontinuously operating machines for hard-centre caramels.

The problem on which the invention is based is that of so devising the transfer of sweets from the gripper wheel to the wrapping wheel that longer wrapping wheel stoppage times result.

According to the invention, this is achieved by a transfer part 5 which takes the form of diametrically opposed arcuately outwardly pivoting pairs of forceps 5d which serve on every second indexing step of the gripper wheel to take over two partially wrapped sweets from the gripper wheel at stations IV and V and, upon double onwards movement of the wrapping wheel, simultaneously delivers the two partially wrapped sweets to two adjacent holding elements of the wrapper wheel. Folding of the wrapper into tube form is completed during transfer to and onward movement of the wrapper wheel, simultaneous end twisting of the wrappers of two sweets being effected during wrapper wheel dwell at stations VIIa and VIIb.

FIG. 1



The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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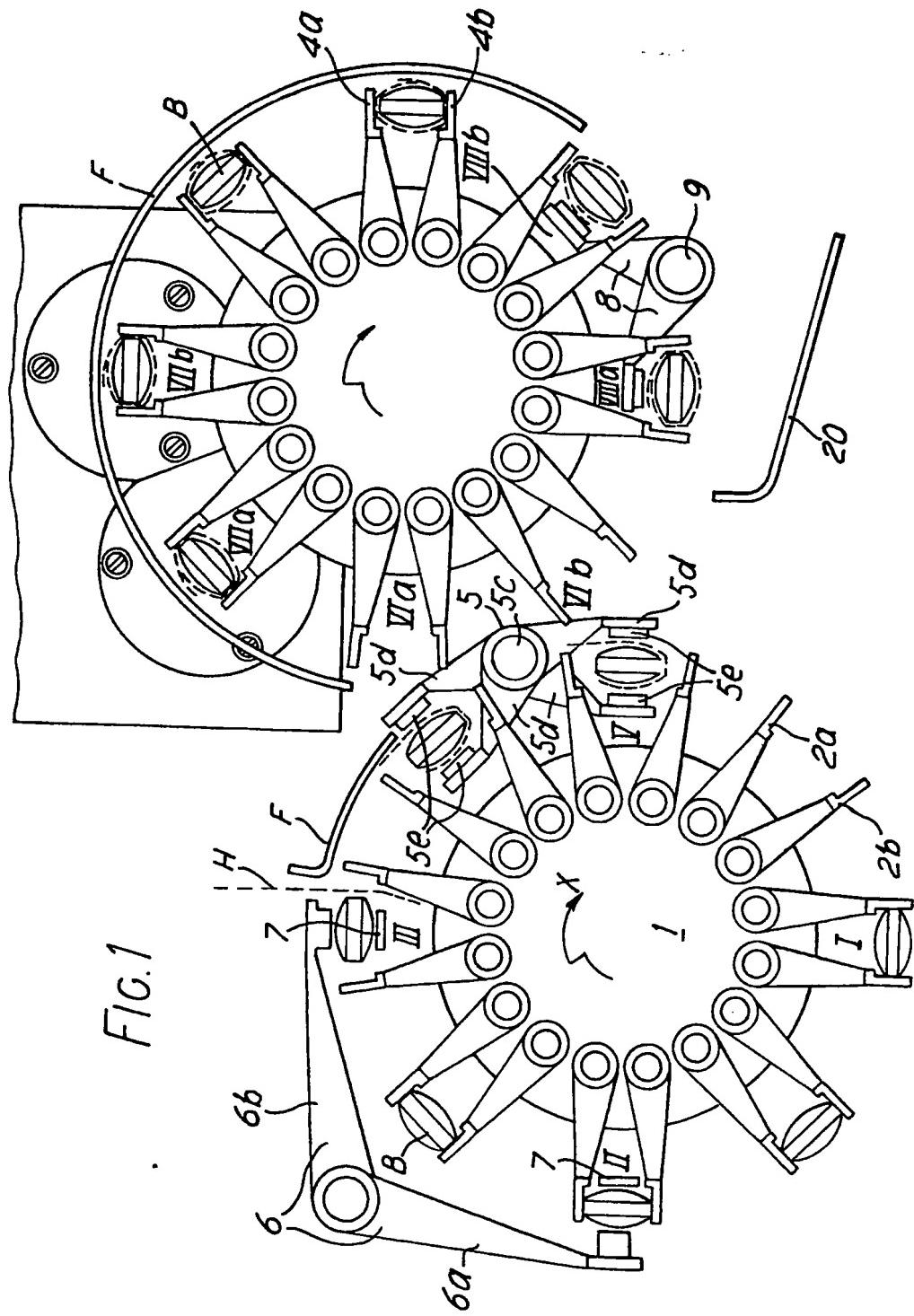
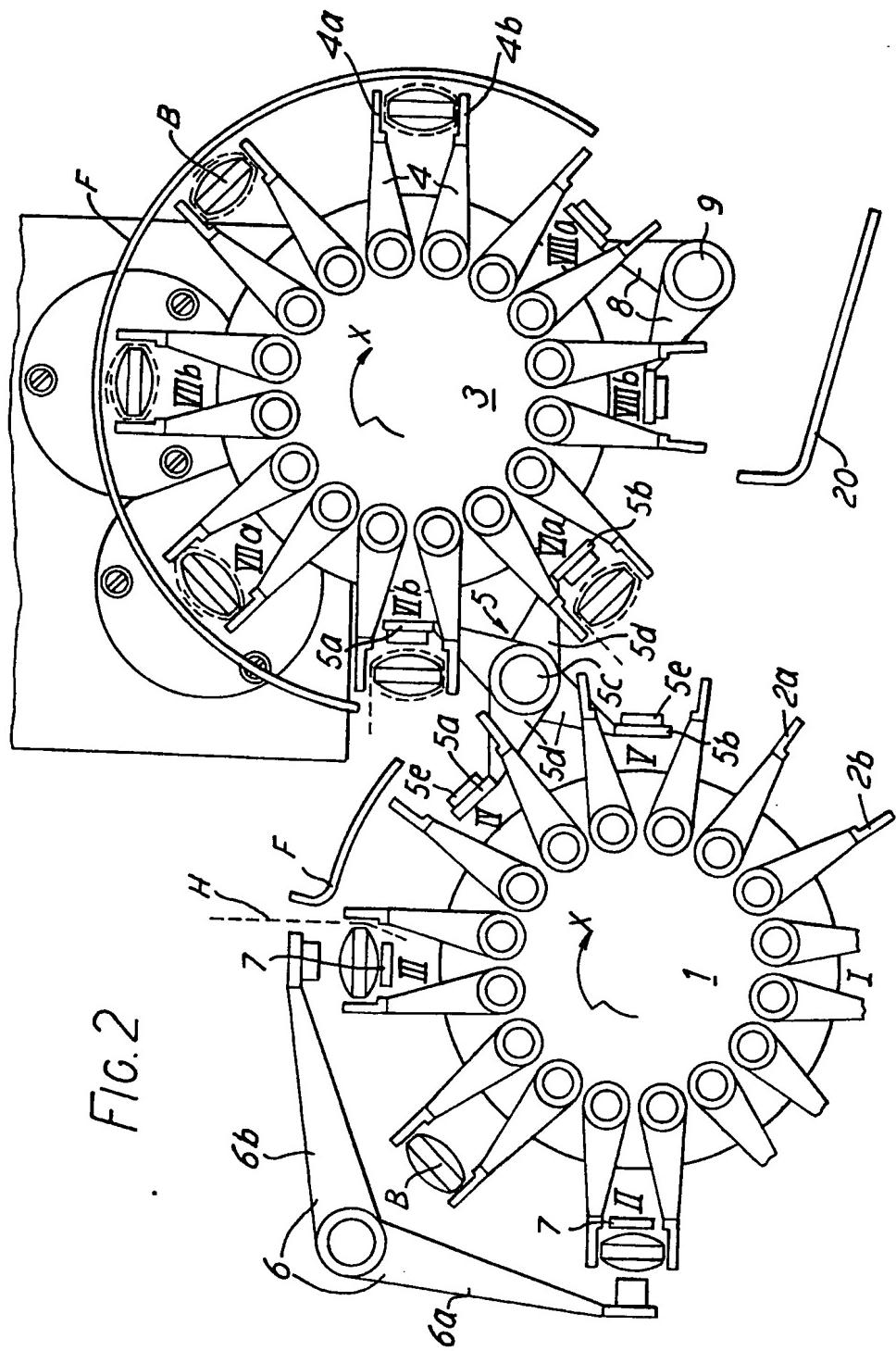


FIG. 1

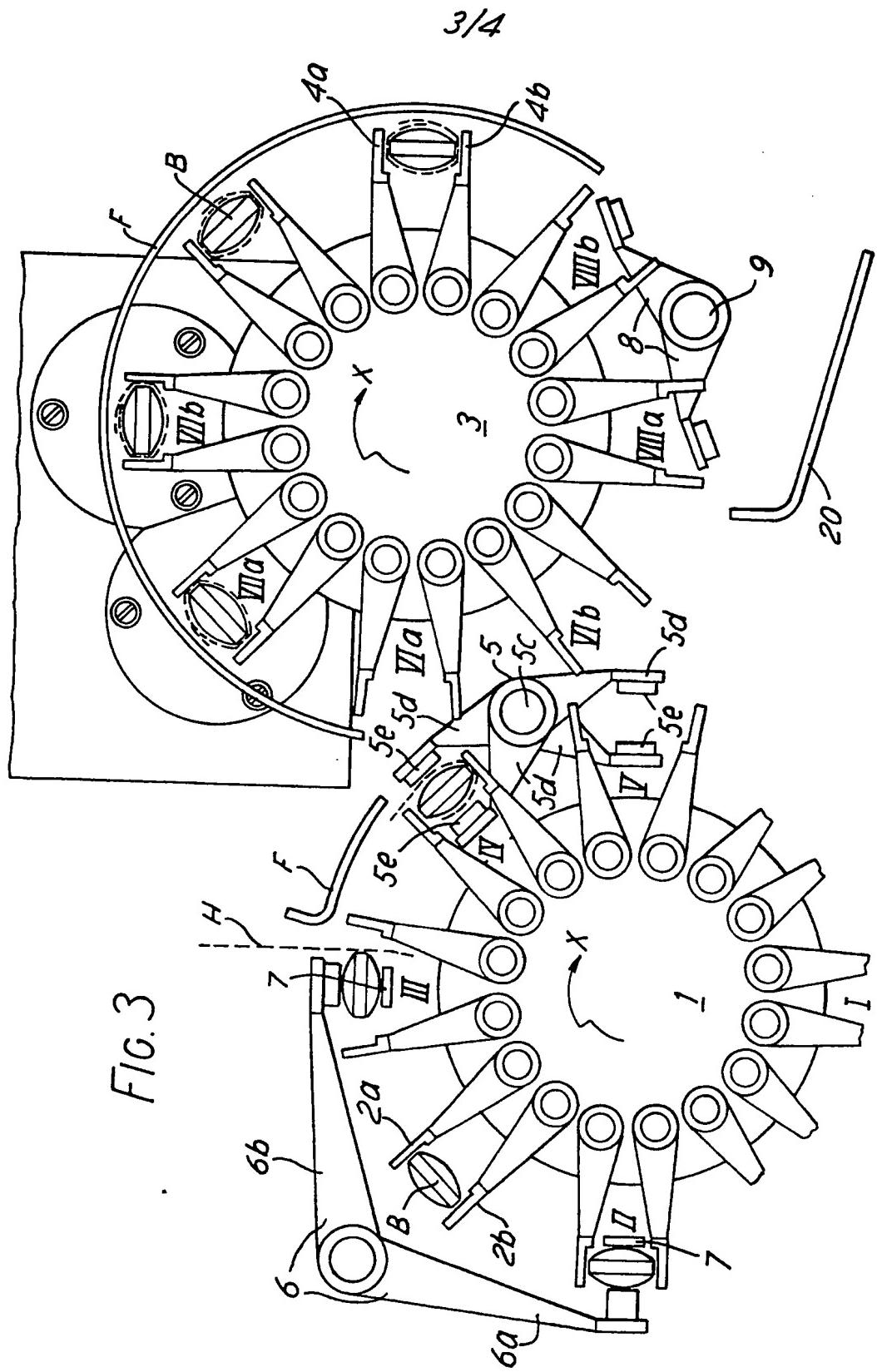
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FIG. 2



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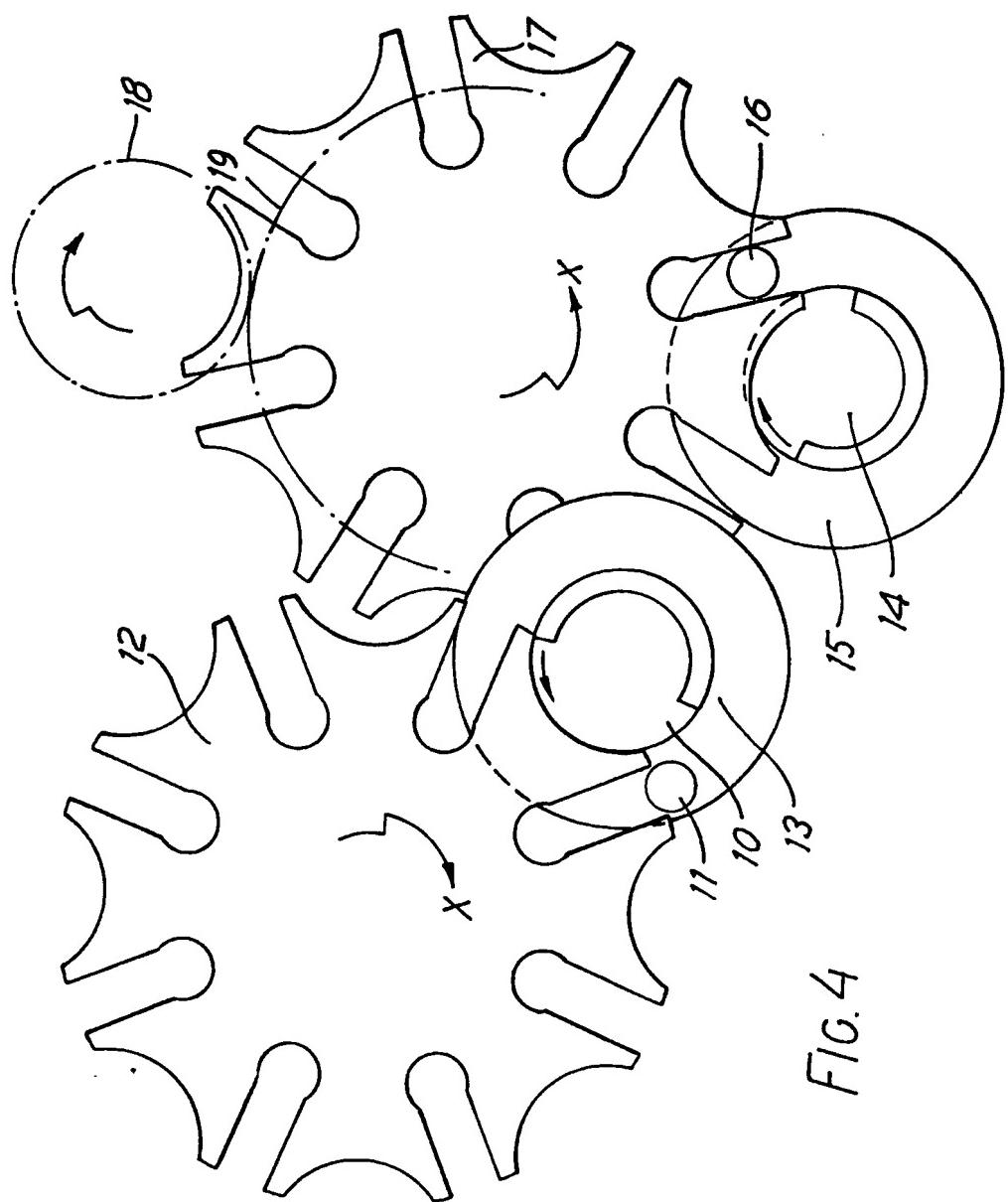


FIG. 4

SPECIFICATION

Apparatus for the discontinuous wrapping of sweets

5 The invention relates to an apparatus for the discontinuous wrapping of sweets or similarly shaped piece goods employing a gripper wheel which picks up the sweets from the
 10 feeder plate and which has radial holding elements and an adjacently disposed wrapping wheel with an identical number of radial holding elements which rotate in the same direction of rotation as the gripper wheel, a wrapper being fed radially from outside between the opened holding elements of the gripper wheel.
 15 A machine for the packaging of mass objects is already known in which the various carriers of the packaging appliances are maintained in a steady and continuous movement during conveyance and during the folding operations. This machine has two adjacent carriers in the form of rotating conveyor wheels,
 20 the gripper mouths of which are staggered by 90° in respect of one another so that the gripper jaws of one carrier pass between those of the other carrier (German Patent Specification No. 606 423). With this apparatus it
 25 is only possible to produce low rates of output since although the transfer time needed is minimal, higher rest times for the wrapping operation are required in the second carrier. Other known apparatuses are likewise
 30 equipped with two adjacently disposed conveyor wheels or wrapping wheels, wherein the transfer from one wheel to the other is direct. Where these apparatuses are concerned, an increase in output is achieved in that a wrapper is already fed to the first conveyor wheel and is pre-folded therein. Thus, the necessary handling times in the second wrappingwheel
 35 can be reduced so that the overall output of the machine is increased (DOS 24 14 646).
 40 Where soft caramels are being wrapped, the last folding operations can be undertaken by radially outwardly disposed folding elements, whereas for wrapping hard caramels, this is no longer possible with only one rotary gripper per twisting the wrapper ends. It has therefore already been proposed, as a function
 45 of the number of holding elements on the wrapping wheel, to arrange an equal number of rotary grippers on the same pitch circle in a
 50 rotary gripper head alongside the wrapping wheel and coaxially of the main drive shaft (DD-PS 139 559). It is true that high rates of output can be achieved with this continuously operating apparatus, but the construction is
 55 very expensive so that use for specific packaging processes is no longer economically advantageous. In order to increase the output of such wrapping machines which operate continuously and in which, in comparison with con-
 60 tinuously operating wrapping machines, the
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technical complication is not so great, various technical solutions have already been disclosed. In the case of one of these known apparatus for wrapping sweets, sweets fed to the charging plate in two rows are handled by a packaging head and by a paper feed head (DAS 10 63 080; DAS 10 66 477). Doubling up the equipment has indeed provided a greater output but this solution has the disadvantage that the expense is increased. Finally, an apparatus is known which in order to achieve better isolation and feeding operation with two stepwise revolving feed discs. These feed discs are so associated with the conveyor wheel that when they stop at specific transfer points, each has its filled marginal pocket coincident with an empty pocket on the simultaneously filled but stopped conveyor wheel and the piece goods which they convey are delivered individually to the pocket of the more rapidly revolving conveyor wheel. Transfer of the piece goods from the feed disc into the conveyor wheel 17 is effected by sliders mounted on the cross arms of a T-shaped pivot lever. The pivot lever is mounted pivotally on an axis of rotation which is central between the two feeder discs and during the times when the feeder discs are stopped, it is reciprocated (DAS 10 57 956). This apparatus is not suitable for the object of the invention, because the switching times for the wrapping wheel downstream of the first gripper wheel and which conclude the wrapping process do not reduce.
 100 The purpose of the invention is to increase the output of discontinuously operating wrapping machines for hard caramels.
 The object of the invention lies in so devising the transfer of sweets from the gripper wheel to the wrapping wheel of a wrapping machine which operates stepwise that the wrapping wheel can enjoy longer rest times.
 According to the invention, this is achieved by a two-armed transfer part serving two adjacently disposed holding elements and taking the form of diametrically opposed arcuately outwardly pivoting pairs of forceps between gripper wheel and wrapping wheel, which is so arranged stepwise to match the gripper wheel and wrapping wheel that at every second working step two forceps take over partially wrapped sweets from the gripper wheel and during double onwards switching of the wrapping wheel both forceps arms are used simultaneously to deliver the partially wrapped sweets to two adjacent holding elements of the wrapping wheel. Thus, advantageously, the rest time available for the wrapping process in the wrapping wheel is doubled in comparison with the rest time of the gripper wheel, so that the overall output of the wrapping machine can be increased. According to a further feature of the invention, the two forceps arms of the transfer part, prior to initiation of the next switching step of the

gripper arm, are switched back to their starting position. Thus, the wrapping wheel can be switched on without hindrance from the forceps arms. The gripper wheel and the wrapping wheel are according to the invention driven by a Maltese cross transmission and stepwise, whereas the two forceps arms of the transfer part are driven by a cam-operated drive. This type of drive is an advantageous and favourable solution requiring the minimum of cost for switching the transfer part and gripper wheel and also the wrapping wheel.

The invention is explained hereinafter with reference to an example of embodiment which 15 is shown in the accompanying drawings, in which:

Figs. 1 to 3 show a side view in various phases of transfer and

Fig. 4 is a diagrammatic view of the drive in 20 side elevation.

The sweets B which are intended to be wrapped in one rotary wrapping motion are taken by the gripper wheel 1 from a feeder plate, not shown. The gripper wheel 1 has 25 radial holding elements 2 with in each case pairwise co-operating holding jaws 2a, 2b, between which the sweets are held in a closed position. Disposed alongside the gripper wheel 1 and in the same vertical plane is a wrapping 30 wheel 3 which has an identical number of holding elements 4 with holding jaws 4a, 4b as the gripper wheel 1. The holding elements 2, 4 of the gripper wheel 1 and of the wrapping wheel 3 are radially so dimensioned that in 35 revolving motion they do not touch each other. The gripper wheel 1 and the wrapping wheel 3 are driven intermittently by means of a drive which is not described in greater detail hereinafter but in the same direction (arrow x). 40 In the region of the narrowest tangential proximity of the holding elements 2, 4 of the gripper wheel 1 and wrapping wheel 3 there is a two-armed transfer part 5. The transfer part 5 is constructed in the form of diametrically opposite pairs of forceps and is so dimensioned 45 that it is arcuately pivotable outwards and, when two adjacent holding elements 2 of the gripper wheel are immobilised, takes the sweets B and can transfer them to two adjacently disposed holding elements 4 of the wrapping wheel 3. In detail, the pairs of forceps can be constituted by two forceps arms 5d mounted scissor-like on a single spindle 5c and which are driven independently of each 50 other by a cam drive, not shown. The free ends of the forceps arms are angled over somewhat so that, provided with a bearing surface 5e, they can reach their extreme position in a tangential orientation centrally between the corresponding holding elements 2, 4. As a drive for the gripper wheel 1 and for the wrapping wheel 3, a Maltese gear transmission shown in Fig. 4 is provided. The Maltese gear transmission consists of, disposed on the main drive shaft 10, a driver 11

which drives the gripper wheel 1 through a Maltese gear 12. Also mounted on the drive shaft 10 is a gearwheel 13 which meshes with a gearwheel 15 disposed on a subsidiary shaft 14. Disposed on the subsidiary shaft 14 is a driver 16 which, through a Maltese gear 17 and a pair of gearwheels 18, 19, drives the wrapping wheel 3. This Maltese gear transmission is so constructed that the holding elements 2 of the gripper wheel 1 pass the periphery of one working station at every switching step while the holding elements 4 of the wrapping wheel 3, at every switching step, jump a working station as they move 80 on.

On the periphery of the gripper wheel 1 and of the wrapping wheel 3 are disposed the various working stations at which the wrapping operation is carried out in stepwise fashion. At the gripper wheel 1, first of all there is at the bottom a receiving station I which is not shown in greater detail. Viewed in the direction of the arrow x, there follows a sensing station II and a packaging medium feed 85 station III. The sensing station II and the packaging medium feed station III are augmented by a two-armed lever 6 which in the working position has its free ends bearing radially from the outside on the sweets B which are located 90 in the holding elements 2. Disposed at both these stations II and III are radially inwardly rigid base plates 7 which serve as holders to counter the levers 6 which bear from the outside. Then follow two transfer stations IV, V 95 from which, by means of the already-described part 5, the sweets can be passed into the holding elements 4 of the adjacently disposed wrapping wheel 3. The working stations located on the wrapping wheel 3 are in 100 each case constructed as double stations, two adjacent holding elements 4 swinging into the relevant stations. Between the packaging medium feed stations III and the transfer station IV there is radially outwardly an arcuate folding plate F for folding the first turn-in of the 105 radially fed wrapper H.

Provided as the first working station of the wrapping wheel 3 is a transfer station VIa, VIb which has no special design. Following 110 next is a turning-in station VIIa, VIIb which is completed by two not shown rotary grippers on the end faces. At the bottom end of the wrapping wheel 3 is an ejector station VIIIa, VIIIb equipped with a double-armed ejector lever 8. The dimensions of the ejector lever 8 are such that its two free ends engage centrally between the holding jaws 4a, 4b of two adjacent holding elements 4 and are pivotally mounted on a spindle 9 in order to be able to 115 120 eject those sweets which are disposed in the holding elements 4a, 4b. After the takeover station VIa, there is fixed on the outside, on the periphery, a folding plate F which extends as far as the ejector station VIIIa and which 125 130 serves to make the second fold in the wrap-

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per H in the wrapping wheel.

The ensuing description will explain the way in which the apparatus works.

- 5 The sweets B which are to be wrapped, resting on the feeder plate, not shown, move into the region of holding elements 2 of gripper wheel 1. The holding jaws 2a, 2b are initially still open until they have reached the receiving station I. In the receiving station I,
- 10 the sweets are passed from below into place between the holding jaws 2a, 2b. Transfer of sweets B, like all the other operating steps in the subsequent station, take place during the stop times or rest times. Still while the gripper wheel 1 is stopped, the holding jaws 2a, 2b close and grip a sweet B. The gripper wheel 1 then moves on by one indexing step, so that the next holding elements 2 of the gripper wheel 1 are positioned in the region of the receiving station I. The sweet B picked up by the holding elements 2, after passing through an empty station, moves into the region of a sensing station II where one lever arm of the lever 6 moves its free end up to
- 15 the sweet B and ascertains whether there is a charge. If there is no sweet in the holding elements 2, the packaging feed is switched off. The holding element 2 leaving the sensing station II with the sweet B then, after passing
- 20 through an empty station, arrives in the region of a packaging feed station III. The sweet B is there released by the opening holding jaws 2a, 2b and rests on the bottom plate 7 while at the same time the free end of the lever arm 6a moves down from above to rest on the sweet. The wrapper H is then introduced from a radially outward direction against the front face of the holding jaw 2a. After insertion of the wrapper at the station III, the holding jaws 2a, 2b are closed again and the lever arm 6b returns to its initial position. The gripper wheel 1 then moves on by another indexing stage, the outwardly projecting end of the wrapper H being applied against the sweet by
- 25 the folding plate F, as can be seen particularly clearly in Fig. 1. In the transfer station IV, the lower bearing face 5e of the forceps arm 5d applies the wrapper H in a U-shape around the sweet B, the upper bearing face 5e serving as
- 30 a continuation or extension of the folding plate F. At this transfer station IV, after brief opening, the holding element 2 is closed again and moved on to the transfer station V. In the same way, in the meantime, the subsequent holding element 2, provided with a partially wrapped sweet B, has arrived at the transfer station IV. Once both transfer stations IV, V have been charged with partially wrapped sweets B by the holding elements 2, i.e. after
- 35 two indexing steps of the gripper wheel 1, the transfer part 5 comes into action. During a rest or stop time of the gripper wheel 1 and of the wrapping wheel 3, the holding elements 2 of the gripper wheel 1 open and the forceps arms 5d pivot arcuately about the axis

5c, each with a partially wrapped sweet B in the pairs of forceps as far as a position between the opened holding elements 4 of the wrapping wheel 3. Upon entry of the pairs of forceps between the opened holding elements 4, the wrapper H is simultaneously placed about the fourth side of the sweet B, as can be seen particularly from Fig. 2.

- 70 The holding elements 4 located in the take-over station VIa, VIb are closed then so that the two sweets B are fixed by them. At the same time, the lower forceps arms 5d move back again until they reach their starting position, corresponding to the illustration in Fig. 2.
- 75 The wrapping wheel 3 is then moved on by two switching steps so that the two holding elements 4 run pairwise into the turning-in stations VIIa, VIIb. The end still protruding radially outwardly in the transfer stations IV, V is during the phase of movement between the stations wrapped around the sweets B by the outer folding plate F. Thus, in the two turning-in stations VIIa, VIIb, both sweets B are enclosed by the now tubular wrapper H, so that
- 80 all remains is to twist the still laterally projecting ends. This final wrapping process is undertaken in the two turning-in stations VIIa, VIIb by rotary grippers which are not shown. For this turning-in process, therefore, twice
- 85 the time is available for twisting in the ends of the wrapper compared with the indexing times of the gripper wheel 1, since the wrapping wheel 3 does not move on until after two indexing or switching steps. The favourable switching times which are thus achieved can be used in order to increase the overall output of the machine. During the phase of turning in in the turning-in station VIIa, VIIb, the upper forceps arms 5d likewise return to their starting position, as shown in Fig. 3. In this time, the next sweet B will meanwhile have already moved into the range of the holding part 5. Before the wrapping wheel 3 moves on by a double indexing step,
- 90 100 the second sweet B will have been taken over into the holding part 5 after two indexing steps of the gripper wheel 1, in the way already described at the outset. The next double indexing step of the wrapping wheel 3
- 105 110 leads to an empty station in which the completely wrapped sweets B are carried by the holding elements 4. In the stations I to VII, meanwhile, the aforescribed working operations are repeated. After a further double indexing step of the wrapping wheel 3, the corresponding holding elements 4 move together with the wrapped sweets B into the ejector stations VIIIa, VIIIb. As shown in Fig. 3, with opening of the holding elements 4, the ejector levers 8 come into action and eject the sweets B from the back into a chute 20. The opened holding elements 4 of the wrapping wheel 3 are then again ready to pick up sweets and at the next double indexing step
- 115 120 125 130 they move into the pick up stations VIa, VIb

and stop. The working operations already described are then repeated again from the start.

CLAIMS

- 5 1. An apparatus for the discontinuous wrapping of sweets or similarly shaped piece goods, employing a gripper wheel which picks up the sweets from the feeder plate and which has radial holding elements and an adjacently disposed wrapping wheel with an identical number of radial holding elements which rotate in the same direction of rotation as the gripper wheel, a wrapper being fed radially from outside between the opened holding elements of the gripper wheel, characterised by a two-armed transfer part (5) serving two adjacently disposed holding elements (2, 4) and taking the form of diametrically opposed arcuately outwardly pivoting pairs of forceps between gripper wheel (11) and wrapping wheel (3), which is so arranged stepwise to match the gripper wheel (1) and wrapping wheel (3) that at every second working step two forceps (5d) alternately take over partially wrapped sweets (B) from the gripper wheel (1) and during double onwards switching of the wrapping wheel (3) both forceps arms (5d) are used simultaneously to deliver the partially wrapped sweets (B) to two adjacent holding elements (4) of the wrapping wheel (3).
- 25 2. Apparatus according to Claim 1, characterised in that the two forceps arms (5d) of the transfer part (5) are switched back to their starting position before the next onwards step of the gripper wheel (1) is started.
- 35 3. Apparatus according to Claim 1 and 2, characterised in that the gripper wheel (1) and the wrapping wheel (3) are driven stepwise via a Maltese cross transmission.
- 40 4. Apparatus according to Claim 1 to 3, characterised in that both forceps arms (5d) of the transfer part (5) are driven via a cam operated drive.
- 45 5. An apparatus for the discontinuous wrapping of sweets or similarly shaped piece goods as claimed in Claim 1, substantially as herein described with reference to and as illustrated by the example shown in the accompanying drawings.

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